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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,245	08/29/2001	Tongbi Jiang	2421.1US (99-0408.1)	8370

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EXAMINER

IM, JUNGHWA M

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/05/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant No.

09/942,245

Applicant(s)

JIANG, TONGBI

Examiner

Junghwa M. Im

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 17, 18, 25, 42 and 43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 19-24, 26-41 and 44-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-16, 19-24, 26-41 and 44-50 in Paper No. 12 is acknowledged.

Since claim 50 is directed to the embodiment of Fig. 5 which is a non-elected species, claim 50 is treated as an non-elected claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 6, 8, 10, 12, 14, 16, 26, 28, 31, 33, 35, 37, 39 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Estes et al. (US 6,410, 415), hereafter Estes.

Regarding claims 1, 3, 6, 8, 10, 12, 14, 16, 26, 28, 31, 33, 35, 37, 39 and 41, Fig.4 of Estes shows a semiconductor assembly comprising: a semiconductor device (a die) 1 having an active surface having at least one bond pad 6, a substrate 3 having an upper surface having at least one circuit (an electrode 4 on substrate 3 and col. 1 line 14) at least one bump 2 connecting one bond pad on said active surface of said semiconductor device to said at least one circuit on said upper surface of said substrate, said at least one bump

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forming a gap (8 in Fig. 6) between said semiconductor device and said substrate and underfill material 5 provided between said substrate and said semiconductor device and a wetting agent layer provided on the active surface of said semiconductor device (col. 17, lines 51-52).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 4-5, 7, 9, 11, 13, 15, 19, 27, 29-30, 32, 34, 36, 38, 40 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estes in view of Wong et al. (US 6,180, 696), hereafter Wong.

Regarding claims 2, 4-5, 7, 9, 11, 13, 15, 19, 27, 29-30, 32, 34, 36, 38, 40 and 44, Estes shows a substantially identical structure to the device of the pending claims except a specified wetting material. Wong discloses ethyltrimethoxysilane as a wetting material for an underfill process applied for a flip chip packaging. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching of Wong for the wetting layer of Estes in order to have to good adhesion between chips and substrates, therefore reducing a surface tension in-between as taught in a portion of col. 15, lines 18-22 of Wong's reference.

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Claims 20, 21, 23, 24, 45, 46, 48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estes in view of DeFelice et al. (US 6,190,940), hereafter DeFelice.

Regarding claims 20, 21, 23, 24, 45, 46, 48 and 49, Fig.4 of Estes shows a semiconductor assembly comprising: a semiconductor die (a chip) 1 having an active surface having a plurality of bond pads 6, a substrate having an upper surface having a plurality of circuits (electrodes 4 on substrate 3 and col. 1 line 14), a plurality of bumps 2 connecting said plurality of bond pads on said active surface of said semiconductor die to said plurality of circuits on said upper surface of said substrate, said plurality of bumps forming a gap between said semiconductor die and said substrate, an underfill material 5 provided between said substrate and said semiconductor die, and a wetting agent layer provided on said active surface of said semiconductor die (col. 17, lines 51-52).

Estes shows a substantially identical structure to the device of the pending claims except wetting the surface of a substrate. Fig. 8 of DeFelice shows a semiconductor device comprising a chip (a die) 21, bumps 41 and a wetting layer 39 formed on the substrate (col. 8, lines 4-5). . It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of DeFelice to the substrate layer of Estes in addition to the active surface of the chip since having a wetting layer on the both surfaces of a chip and a substrate provide a better adhesion and lessening a deformity caused by the tension between the chip and the substrate.

Claims 22 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estes and DeFelice as applied to claims 20 and 45 above, and further in view of Wong.

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A device of Estes and DeFelice shows a substantially identical structure to the device of the pending claim except a specified wetting material. Wong discloses ethyltrimethoxysilane as a wetting material for an underfill process applied for a flip chip packaging. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teaching of Wong for the wetting layer of Estes and DeFelice in order to have to good adhesion between chips and substrates, therefore reducing a surface tension in-between as taught in a portion of col. 15, lines 18-22 of Wong's reference.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi
June 2, 2003

